Supplementary Table 1. All Grade Neurologic Events in the First Month after CAR T Cell Infusion

Pt	Grade 1	Grade 2	Grade 3	Grade 4	Other
4		Myoclonus, sensory neuropathy, agitation	Aphasia, seizure, depressed LOC, encephalopathy		Apraxia, facial automatisms, parkinsonism, frontal release signs, hallucinations
5		Myoclonus, weakness	Aphasia, seizure, encephalopathy, depressed LOC, transient leukoencephalopathy on MRI		Frontal release signs, apraxia
7	Headache	Myoclonus, depressed LOC, gait ataxia, encephalopathy	Aphasia, seizure, hemiparesis		
13			Aphasia, seizure, encephalopathy, depressed LOC		Cogwheeling, increased tone, motor apraxia
14	Myoclonus	Meningismus, agitation, painful sensory neuropathy	Aphasia, seizure, headache, leg weakness, encephalopathy, depressed LOC		Cogwheeling, increased tone
15	Encephalopathy/delirium				
16	Myoclonus/tremor	Encephalopathy, depressed LOC, headache			Verbal perseveration
17			Aphasia, encephalopathy	Seizure, depressed LOC	Verbal perseveration
20		Dysarthria	Aphasia, depressed LOC, encephalopathy		Verbal perseveration
21		Myoclonus	Seizure, depressed LOC, encephalopathy		
23	Encephalopathy/delirium		Seizure		
26	Dysarthria, headache, myoclonus	Depressed LOC	Aphasia, encephalopathy		
27	Dysarthria	Leg weakness, depressed LOC	Aphasia, seizure, encephalopathy		Verbal perseveration, frontal release signs, memory loss, bowel incontinence
28	Headache, encephalopathy/delirium				
29	Headache, encephalopathy/delirium				Motor perseveration
32		Myoclonus	Seizure, depressed LOC, aphasia, hemiparesis, neuropathy	Encephalopathy	
33		Painful sensory neuropathy, dysarthria, leg weakness, depressed LOC	Seizure, encephalopathy, aphasia		
34		Depressed LOC, motor weakness right arm, motor leg weakness	Seizure, aphasia		Pain in legs, increased tone
37	Encephalopathy/delirium				
38	Headache, memory difficulty	Myoclonus, encephalopathy	Seizure, aphasia, depressed LOC		

40	Encephalopathy, asterixis, headache, aphasia				
41	Headache	Pain syndrome	Aphasia, encephalopathy		
42	Tremor	Headache	Aphasia, encephalopathy		
44		Dysarthria, headache, meningismus, depressed LOC	Aphasia, seizure, encephalopathy		
45	Encephalopathy/delirium	Headache, meningismus, aphasia, leg weakness			
46	Meningismus		Depressed LOC, aphasia, transient leukoencephalopathy on MRI brain and spine	Encephalopathy, paraplegia	Right gaze preference
48	Headache, delirium,				
49	Headache, meningismus, encephalopathy				
50	Headache	Painful sensory neuropathy	Seizure, aphasia, depressed LOC, motor neuropathy		
51	Tremor/myoclonus		Seizure, encephalopathy, depressed LOC, transient leukoencephalopathy on MRI		Left gaze preference
52	Headache, delirium, tremor				
53		Headache, leg weakness	Aphasia, encephalopathy, transient leukoencephalopathy on MRI		Facial automatisms, left gaze preference, cogwheeling, verbal perseveration
54	Headache				

LOC: loss of consciousness

Supplementary Table 2: Correlation between CAR T cell phenotypes and neurotoxicity

	Overall	Gr 0-2 NTX (N=31)	Gr 3-4 NTX (N=22)	p-value
Total CAR CD8 T Cell	49.75 (3.34, 224.54)	55.76(5.8, 174.3)	43.95 (3.34,224.54)	0.69
CD4: CD8	2.45 (0.11, 29.54)	2.51 (0.11,29.54)	1.93 (0.41, 22.5)	0.22
CD8 naïve, CCR7+CD45RA+	9.68 (0.14, 85.9)	11.4 (0.14, 79.9)	9.3 (1.82, 85.9)	0.83
N missing	2	2	NA	
CD8 central memory, CCR7+CD45RA-	0.46 (0.01, 7.27)	0.43 (0.01, 4.19)	0.49 (0.01, 7.27)	0.60
N missing	2	2	NA	
CD8 effector memory, CCR7-CD45RA-	6.94 (0.05, 49.2)	6.93 (0.08, 49.2)	8.54 (0.05, 33.5)	0.97
N missing	2	2	NA	
CD8 effector, CCR7-CD45RA+	72 (12.7, 99.5)	71.9 (12.7, 99.5)	76.1 (12.9, 92.3)	0.79
N missing	2	2	NA	
CD4 naïve, CCR7+CD45RA+	2.45 (0.18, 70)	3.12 (0.18, 47.4)	2.42 (0.25, 70)	0.77
N missing	2	2	NA	
CD4 central memory, CCR7+CD45RA-	2.7 (0.04, 19.4)	1.95 (0.04, 19.4)	2.92 (0.32, 9.26)	0.44
N missing	2	2	NA	
CD4 effector memory, CCR7-CD45RA-	52.7 (0.48, 91.9)	47.2 (0.48, 91.9)	64.65 (3.28, 88.7)	0.71
N missing	2	2	NA	
CD4 effector, CCR7-CD45RA+	32.3 (3.49, 96.4)	33.7 (5.77, 96.4)	28.5 (3.49, 85.9)	0.61
N missing	2	2	NA	

NTX: neurotoxicity; N: number of patients

Supplementary Table 3: Correlation between CSF cytokines and CSF protein concentrations during the acute phase of neurotoxicity (n=11). Significant cytokines are listed.

CSF Cytokine	Correlation Coefficient*	*P* value
GSCF	0.824	0.0009
Flt3L	0.753	0.004
IFNγ	0.737	0.004
GRO	0.862	0.0002
IL10	0.901	<0.001
IL8	0.879	<0.001

*Pearson's correlation coefficients (r values) and P values are shown.

Supplementary Table 4: Definition of cytokine release syndrome grades

Grade	Definitions
Grade 1	Mild symptoms, requiring observation or symptomatic management only (*e.g.* antipyretics, antiemetics, pain medications, etc.)
Grade 2	Moderate symptoms Hypotension requiring vasopressors < 24 hours, or Hypoxia or dyspnea requiring supplemental oxygen <40% (up to 6L NC)
Grade 3	Severe symptoms Hypotension requiring vasopressors ≥24 hours, or Hypoxia or dyspnea requiring supplemental oxygen ≥40%
Grade 4	Life-threatening symptoms Hypotension refractory to vasopressors Hypoxia or dyspnea requiring mechanical ventilation
Grade 5	Death